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Effect of non-edible oils on population buildup of acarid mite, *Tyrophagus putrescentiae* Schrank on stored groundnut

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ABSTRACT

The effects of different non-edibles oils were tested in terms of population build-up of acarid mite, *T. putrescentiae* at 30, 60 and 90 days interval. The mite population, 30 days after treatment was noticed in control (331.00 mites). In *Neem* oil treated groundnut at 0.50 ml/kg, 1.00 ml/kg and 2.00 ml/kg concentrations, and the population was 164.33, 103.33 and 85.67 mites. Further, 60 days after treatment, the maximum mite population was noticed in case of untreated control (814.87 mites). In *Neem* oil and eucalyptus oil treated groundnut seeds at 0.50 ml/kg, 1.00 ml/kg and 2.00 ml/kg concentration, the mite population was zero. Likewise, 90 days after mixing of different oils in groundnut seeds, the maximum mite population was recorded in control (1055.67 mites). In *Neem* oil treated groundnut seeds, the mite population was zero and it was also zero in case of eucalyptus oil treated groundnut seeds at all the three concentrations. Among all the non-edible oils treated groundnut seeds, the mite population was highest in alsi oil at 0.50 ml/kg concentration (867.17 mites).

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INTRODUCTION

Grain provides an abundant source of nutrients to variety of organisms. The interactions between grain and organisms/pests largely depend upon the micro-environment, the grains are stored in, which may lead to bio-deterioration of the grain (Shaaya *et al*., 1997). More approximate damage to stored grains and grain products is done by pests in tropical zone (20-30 %), which is very high as compared to temperate zone (5-10 %). Sometimes, damage is very high reaching upto 40 per cent, especially in developing and under developed countries as modern storage technologies have not been introduced (Shaaya *et al*., 1997). Mites act as secondary invaders among storage pests as they cannot infest sound grain instead feed upon broken kernels, debris, high moisture seeds or damaged grain by primary insect pests. These invaders contribute directly to grain spoilage after establishment, just as primary pests do (Weaver and Petroff, 2009). Stored-grain mites damages usually go unnoticed until the grain is removed from the storage

facility. Mites from family Acaridae are gaining importance as storage pests due to their increasing incidence and their association/ interaction with fungi and insects causing rapid qualitative and quantitative deterioration of grains (Weaver and Petroff, 2009). Studies on acarid mites infesting stored products have been conducted in several regions throughout the world (Weaver and Petroff, 2009). Among the stored grain mite *Tyrophagus putrescentiae* Schrank (Schrank, 1781) is a ubiquitous, agriculturally, medically important mite species and is considered a severe pest of number of stored commodities with high fat and protein content throughout world. The mite, *T. putrescentiae* is a common and serious pest of stored grains due to its ability to tolerate low humidity and a wide range of temperatures (Hughes, 1976). It can cause problems for many foodstuffs ranging from weight reduction and degradation of stored foods to accumulation of harmful residues (fungi, dead mites, faeces, eggs and bits of food) through their activities (Hughes, 1976 and Zdarkova, 1971). This makes the infested grain storage unhygienic. World over, there is an increasing trend among grain buyers towards zero-tolerance to these contaminants. For effective and economical management of the mite, *T. putrescentiae* it is very important to use economical and ecologically sound management practices. Among these practices use of plant oils serve as one option. Therefore to know the effect of different non-edible oils on population build up of the storage mite *T. putrescentiae* the present experiment were carried out under the laboratory conditions.

MATERIAL AND METHODS

Mite, *T. putrescentiae* was reared in plastic Petri dishes (5 cm diameter) with groundnut and yeast flour as food (4:1). These were placed in a dessicator containing super saturated solution of Potassium chloride to provide desired humidity which in turn was placed in BOD. Thus, stock culture of *T. putrescentiae* was maintained in laboratory at 27±10ºC and 80-85% RH. Copulating pairs were picked from the culture and were released in observation arenas. Five non-edible oils were used against acarid mite, *T. putrescentiae* infesting stored groundnut seeds, 15 g of groundnut seeds were taken in a Petri dishes (11 cm x 2 cm) and 15 pairs of adult mite were released to it. Each non-edible oils treated at three specified concentrations (0.50, 1.0 and 2.0 ml/kg) were mixed thoroughly by mechanical shaking with the groundnut seeds. Prior to application of the non-edible oil, the groundnut seeds were sterilized at 40^0 C for 24 hours in order to make them free from any other infestation. The population build-up of mite was recorded at 30, 60 and 90 days after imposing different non-edible oil treatments.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under the following heads:

Population build-up of mite:

During the year 2017-18, the effects of different non-edible oils were tested in terms of population build-up of mite, *T. putrescentiae* at 30, 60 and 90 days interval. The data on effect of various non-edible oils on population buildup of *T. putrescentiae* were presented in the Table 1 clearly revealed that at 30 days interval the maximum mite population was recorded in control (330.33 mites). In *Neem* oil treated groundnut seeds the mite population was 163.00, 102.00 and 84.67 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. In eucalyptus oil, at 0.50, 1.00 and 2.00 ml/kg concentrations the mite population was 171.33, 111.00 and 90.33 mites, Whereas in castor oil treated groundnut seeds, the mite population was 269.33, 223.67 and 210.00 mites at 0.50, 1.00 and 2.00 ml/kg, respectively. Further, in karanj oil at 0.50, 1.00 and 2.00 ml/kg concentrations the mite population was 239.67, 212.00 and 111.00 mites whereas in alsi oil treated groundnut seeds at 0.50, 1.00 and 2.00 ml/kg the population of acarid mite were 289.67, 239.00 and 212.00. All of these were significantly lower than the untreated control. It is clear from the data that among the non-edible oil treated groundnut seeds the mite population was lowest in case of *Neem* oil at 2.00 ml/kg (84.67 mites), however it was followed by eucalyptus oil (90.33 mites), karanj oil (110.00 mites), castor oil (210.00 mites) and alsi oil (212.00 mites), respectively at 2.00 ml/kg concentrations. The mite population was maximum in alsi oil treated groundnut seeds (289.67 mites) at 0.50 ml/kg concentration. Further, 60 days after the treatment of groundnut seeds, the maximum number of mite population was recorded in case of control 808.33 mites which were significantly higher than other treatments. In *Neem* oil and eucalyptus oil treated groundnut seeds,

mite population was observed zero at all concentrations, whereas in castor oil at 0.50, 1.00 and 2.00 ml/kg concentrations the population was 590.67, 480.67 and 391.00 mites. In karanj oil, the population was 479.33, 311.33 and 213.67 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. Further, in alsi oil treated groundnut, the population level of mite was 715.00, 610.00 and 560.33 mite at 0.50, 1.00 and 2.00 ml/kg concentrations. The population of acarid mite at 90 days after treatment was recorded and the maximum mite population was recorded in control (1051.00 mites). In *Neem* oil and eucalyptus oil treated groundnut seeds at 0.50, 1.00 and 2.00 ml/kg concentrations, the mite population was zero. However, in castor oil treated groundnut seeds, the acarid mite population was 829.33, 675.33 and 547.33 at 0.50, 1.00 and 2.00 ml/kg concentrations. In karanj oil, the acarid mite population at 0.50, 1.00 and 2.00 ml/kg concentrations were 586.00, 0.00 and 0.00 mites, while in alsi oil treated groundnut seeds the mite population at 0.50, 1.00 and 2.00 ml/kg concentrations were 869.67, 729.67 and 663.00 mites. In the present investigation it was much clear that 90 days after application of non-edible oils the mite population was zero in case of *Neem* oil and eucalyptus oil at 0.50, 1.00 and 2.00 ml/kg concentrations and in case of karanj oil the mite population was zero at 1.00 and 2.00 ml/kg concentrations, respectively. Meanwhile, in the year 2018-19, the effects of different non-edible oils on the population build-up of mite infesting groundnut seeds were presented in the Table 1 revealed that 30 days after seed treatment the maximum population of mite was noticed in control (331.67 mites) and was significantly higher in comparison to rest of the treatments. In *Neem* oil treated groundnut seed at 0.50, 1.00 and 2.00 ml/kg concentrations the mite population was 165.67, 104.67 and 86.67 mites, respectively, whereas in eucalyptus oil treated groundnut seeds, the mite population was 173.00, 113.67 and 92.67 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. In castor oil the acarid mite population was 271.67, 226.00 and 213.00 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. The mite population was 242.00, 214.33 and 113.00 in karanj oil treated groundnut at 0.50, 1.00 and 2.00 ml/kg concentrations. In alsi oil treated groundnut seed, the acarid mite population was 288.33, 237.00 and 210.33 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. In the present investigation it was observed that the mite population was lowest in case of *Neem* oil treated groundnut seeds (86.67 mites) at 2.00 ml/kg concentration. However, among the various non-edible oil treatments maximum mite population (288.33 mites) was noticed in case of alsi oil treated groundnut seeds at 0.50 ml/kg concentration. Further, the mite population was lower when groundnut seeds were treated with the higher doses (2.00 ml/kg) of non edible oils *i.e. Neem* oil (86.67 mites), eucalyptus oil (92.67 mites), karanj oil (113.00 mites), castor oil (213.00 mites) and alsi oil (210.33 mites), respectively. The mite population was recorded 60 days after application of different non-edible oils and result was presented in the Table 1. It is evident from the data that maximum mite population was noticed in control (821.00 mites). In *Neem* oil and eucalyptus oil treated groundnut seeds the mite population was recorded zero at all the three concentrations *i.e.* 0.50, 1.00 and 2.00 ml/kg. Further, the acarid mite population was 594.00, 483.33 and 394.67 in castor oil treated groundnut seeds at 0.50, 1.00 and 2.00 ml/kg concentrations. In karanj oil treated groundnut seed at 0.50, 1.00 and 2.00 ml/kg concentrations, the mite population was 481.67, 315.00 and 216.33, respectively. Moreover, in alsi oil treated groundnut seeds the acarid mite population were 717.67, 613.67 and 564.00 mites at 0.50, 1.00 and 2.00 ml/kg concentrations, respectively. In the present study, it was observed that the mite population was zero when the groundnut seeds were treated with *Neem* oil and eucalyptus oil at 0.50, 1.00 and 2.00 ml/kg concentrations. The mite population was highest when groundnut seeds were treated with alsi oil (717.67 mites) at 0.50 ml/kg concentration. The mite population 90 days after the application of non-edible oil treatments were presented in the Table 1. It is evident from the data that mite population was maximum in case of untreated control (1060.33 mites). In *Neem* oil and eucalyptus oil the mite population was zero. However, in castor oil treated groundnut seeds the mite population was 833.33, 679.67 and 551.00 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. Moreover, in karanj oil treated groundnut seeds at 0.50 ml/kg, the mite population was 589.00 whereas at 1.00 and 2.00 ml/kg concentrations the mite population was zero. In case of alsi oil treated groundnut seeds the mite population was 864.67, 726.67 and 659.33 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. In the present study, *Neem* oil and eucalyptus oil at 0.50, 1.00 and 2.00 ml/kg concentrations and karanj oil at 1.00 and 2.00 ml/kg showed no mite

population while at 0.50 ml/kg concentration of alsi oil the mite population was maximum (864.67 mites). Two year pooled over data on population build-up of mite, *T. putrescentiae* on groundnut seeds treated with different concentrations of non-edible oils were presented in the Table 1. The mite population, 30 days after treatment showed that maximum mite population was noticed in control (331.00 mites). In *Neem* oil treated groundnut at 0.50, 1.00 and 2.00 ml/kg concentrations and the population was 164.33, 103.33 and 85.67 mites. In eucalyptus oil treated groundnut seeds, the population was 172.17, 112.33 and 91.50 at 0.50, 1.00 and 2.00 ml/kg concentrations, respectively. In castor oil treated groundnut seeds, the acarid mite population was 270.50, 224.83 and 211.50 mites at 0.50, 1.00 and 2.00 ml/kg concentrations, respectively. Moreover, in case of karanj oil treated groundnut seeds at 0.50, 1.00 and 2.00 ml/kg concentrations the population was 240.83, 213.17 and 111.50 mites. Further, the mite population was 289.00, 238.00 and 211.17 mites at 0.50, 1.00 and 2.00 ml/kg in alsi oil treated groundnut seeds. Further, 60 days after treatment, the maximum mite population was noticed in case of untreated control (814.87 mites). In *Neem* oil and eucalyptus oil treated groundnut at 0.50, 1.00 and

Table 1 : Effect of different non-edible oil on population build-up of *T. putrescentiae* on groundnut

Treatments	Conc. (ml/kg)	Year 2017-18			Year 2018-19			Pooled		
		30 Days	60 days	90 days	30 days	60 days	90 days	30 Days	60 days	90 days
Neem oil	0.5 ml	12.76 (163.00)	0.71 (0.00)	0.71 (0.00)	12.87 (165.67)	0.71 (0.00)	0.71 (0.00)	12.82 (164.33)	0.71 (0.00)	0.71 (0.00)
	1.0 ml	10.09 (102.00)	0.71 (0.00)	0.71 (0.00)	10.22 (104.67)	0.71 (0.00)	0.71 (0.00)	10.16 (103.33)	0.71 (0.00)	0.71 (0.00)
	2.0 ml	9.18 (84.67)	0.71 (0.00)	0.71 (0.00)	9.29 (86.67)	0.71 (0.00)	0.71 (0.00)	9.24 (85.67)	0.71 (0.00)	0.71 (0.00)
Eukalyptus oil	0.5 ml	13.09 (171.33)	0.71 (0.00)	0.71 (0.00)	13.15 (173.00)	0.71 (0.00)	0.71 (0.00)	13.12 (172.17)	0.71 (0.00)	0.71 (0.00)
	1.0 ml	10.53 (111.00)	0.71 (0.00)	0.71 (0.00)	10.65 (113.67)	0.71 (0.00)	0.71 (0.00)	10.59 (112.33)	0.71 (0.00)	0.71 (0.00)
	2.0 ml	9.49 (90.33)	0.71 (0.00)	0.71 (0.00)	9.60 (92.67)	0.71 (0.00)	0.71 (0.00)	9.54 (91.50)	0.71 (0.00)	0.71 (0.00)
Castor oil	0.5 ml	16.40 (269.33)	24.31 (590.67)	28.81 (829.33)	16.47 (271.67)	24.38 (594.00)	28.87 (833.33)	16.43 (270.50)	24.35 (592.33)	28.84 (831.33)
	1.0 ml	14.94 (223.67)	21.93 (480.67)	25.00 (675.33)	15.02 (226.00)	21.99 (483.33)	26.08 (679.67)	14.98 (224.83)	21.96 (482.00)	26.04 (677.50)
	2.0 ml	14.49 (210.00)	19.78 (391.00)	23.40 (547.33)	14.59 (213.00)	19.87 (394.67)	23.48 (551.00)	14.54 (211.50)	19.83 (392.83)	23.44 (549.17)
Karanj oil	0.5 ml	15.48 (239.67)	21.90 (479.33)	24.22 (586.00)	15.55 (242.00)	21.95 (481.67)	24.28 (589.00)	15.51 (240.83)	21.93 (480.50)	24.25 (587.50)
	1.0 ml	14.55 (212.00)	17.66 (311.33)	0.71 (0.00)	14.63 (214.33)	17.75 (315.00)	0.71 (0.00)	14.59 (213.17)	17.70 (313.17)	0.71 (0.00)
	2.0 ml	10.47 (110.00)	14.63 (213.67)	0.71 (0.00)	10.61 (113.00)	14.72 (216.33)	0.71 (0.00)	10.54 (111.50)	14.67 (215.00)	0.71 (0.00)
Alsi oil	0.5 ml	17.01 (289.67)	26.75 (715.00)	29.50 (869.67)	16.98 (288.33)	26.80 (717.67)	29.41 (864.67)	17.00 (289.00)	26.77 (716.33)	29.46 (867.17)
	1.0 ml	15.45 (239.00)	24.71 (610.00)	27.02 (729.67)	15.39 (237.00)	24.78 (613.67)	26.97 (726.67)	15.42 (238.00)	24.74 (611.83)	26.99 (728.17)
	2.0 ml	14.55 (212.00)	23.68 (560.33)	25.76 (663.00)	14.50 (210.33)	23.76 (564.00)	25.69 (659.33)	14.52 (211.17)	23.72 (562.17)	25.72 (661.17)
Control	-	18.17 (330.33)	28.44 (808.33)	32.43(10 51.0)	18.21 (331.67)	28.66 (821.00)	32.57 (1060.33)	18.19 (331.00)	28.55 (814.67)	32.50 (1055.67)
	S.E. ±	0.320	0.169	0.121	0.344	0.225	0.131	-	-	-
	S. E. ± Treatment							0.235	0.141	0.089
	S. E. ± (Y × T)							0.332	0.199	0.126
	C.D. (P=0.05)	0.923	0.488	0.348	0.990	0.647	0.376	-	-	-
	C. D. (P=0.05) Treatment							0.664	0.398	0.251
	C.D. (P=0.05) (Y × T)							NS	NS	NS
	CV (%)	4.09	2.06	1.50	4.38	2.72	1.62	4.24	2.41	1.56

* Figures in parentheses are original value while those outside square roots transformed values
NS=Non-significant

2.00 ml/kg concentrations, the mite population was zero. In castor oil at 0.50, 1.00 and 2.00 ml/kg concentrations the mite population was 592.33, 482.00 and 392.83 mites, however in karanj oil treated groundnut seeds, the mite population was 480.50, 313.17 and 215.00 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. The mite population was 716.33, 611.83 and 562.17 mites at 0.50, 1.00 and 2.00 ml/kg when groundnut seeds were treated with alsi oil, respectively. The acarid mite population was significantly higher in case of control (814.67 mites) 60 days after treatment. Likewise, 90 days after the mixing of different non-edible oils in groundnut seeds the maximum mite population was recorded in control (1055.67 mites). In *Neem* oil treated groundnut seeds, the mite population was zero and it was also zero in case of eucalyptus oil treated groundnut seeds at all the three concentrations. Further, in castor oil treated seeds the mite population was 831.33, 677.50 and 549.17 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. In karanj oil treated groundnut seeds, the mite population was zero at 1.00 and 2.00 ml/kg concentrations, while at 0.50 ml/kg concentration the mite population was 587.50 mites. In alsi oil treated groundnut seed the mite population was 867.17, 728.17 and 661.17 mites at 0.50, 1.00 and 2.00 ml/kg concentrations. In the present study 90 days after treatment the mite population was zero at 0.50, 1.00 and 2.00 ml/kg concentrations in *Neem* oil and eucalyptus oil, while in karanj oil at 1.00 and 2.00 ml/kg concentrations the mite population was zero. Among all the non-edible oils treated groundnut seeds the mite population was highest in alsi oil at 0.50 ml/kg concentration (867.17 mites). The mite population was significantly higher in untreated control (1055.67 mites). The results of population build-up showed that there was fall in number of *T. putrescentiae*, on the application of different non-edible oils *i.e. Neem*, eucalyptus, castor, karanj and alsi oil. A pattern of continuous decrease in population was observed from 0.50 to 2.00 ml/kg concentrations. After 30, 60 and 90 days of treatment, there was increase in number of mites, but compared to control all the five oils provided the better protection against *T. putrescentiae*. The present results were more or less in accordance with earlier findings of Rani (2000) who also reported lower population build-up of mite, *S. nesbitti* after 15, 30 and 45 days of treatment with oils on pigeonpea seeds. Further, Rim and Jee (2006) in a study reported a detrimential effect of various essential oils on population buildup of mites, *Dermatophagoides farina* and *D. pteronyssinus*. Assis *et al.* (2011) also reported toxic effect of different oils against acarid mite, *T. putrescentiae* and found low population build-up on oil treated grains. These findings were closely in accordance with the present findings.

Protection of groundnut by non-edible oils:

The protection per cent of groundnut seeds against

Table 2 : Protection of groundnut against *T. putrescentiae* with different non-edible oils

Treatments	Concentration (ml/kg)	Protection (%)		
		30 days	60 days	90 days
Neem oil	0.5	50.35	100.00	100.00
	1.0	68.78	100.00	100.00
	2.0	74.12	100.00	100.00
Eukalyptus oil	0.5	47.99	100.00	100.00
	1.0	66.06	100.00	100.00
	2.0	72.36	100.00	100.00
Castor oil	0.5	18.28	27.29	21.25
	1.0	32.07	40.83	35.82
	2.0	36.10	51.78	47.98
Karanj oil	0.5	27.24	41.02	44.35
	1.0	35.60	61.56	100.00
	2.0	66.31	73.61	100.00
Alsi oil	0.5	12.69	12.07	17.85
	1.0	28.10	24.89	34.20
	2.0	36.20	30.99	37.37
Control	-	-	-	-

acarid mite, *T. putrescentiae* at different time interval at 30, 60 and 90 days after treatment was worked out and presented in the Table 2 showed that 30 days after mixing different non-edible oils in groundnut seeds the maximum protection per cent *i.e.* 74.12 per cent was noticed at 2.00 ml/kg concentration, and was followed other non-edible oils like eucalyptus oil (72.36 %), karanj oil (66.31 %), alsi oil (36.20 %) and castor oil (36.10 %) at higher level of concentration (2.00 ml/kg). The maximum protection per cent was observed in case of *Neem* oil *i.e.* 50.35, 68.78 and 74.12 per cent at 0.50, 1.00 and 2.00 ml/kg, respectively. In eucalyptus oil, 47.99, 66.06 and 72.36 per cent protection at 0.50, 1.00 and 2.00 ml/kg, respectively. While in castor oil treated groundnut seeds at 0.50, 1.00 and 2.00 ml/kg the protection per cent was 18.28, 32.07 and 36.10, respectively. The protection per cent at 0.50, 1.00 and 2.00 ml/kg was 27.24, 35.60 and 66.31 in karanj oil treated groundnut seeds. The protection per cent in case of alsi oil treated groundnut seeds at 0.50, 1.00 and 2.00 ml/kg was 12.69, 28.10 and 36.20, respectively. The protection per cent after 60 days of treatment, 100 per cent protection was observed in *Neem* oil and eucalyptus oil treated groundnut seeds at 0.50, 1.00 and 2.00 ml/kg (Table 1). Further, castor oil treated groundnut seed showed 27.29, 40.83 and 51.78 per cent protection at 0.50, 1.00 and 2.00 ml/kg, respectively. The protection per cent in karanj oil treated groundnut seeds were 41.02, 61.56 and 73.61 per cent at 0.50, 1.00 and 2.00 ml/kg, respectively. Moreover, in alsi oil treated groundnut seeds the protection per cent at 0.50, 1.00 and 2.00 ml/kg was 12.07, 24.89 and 30.99 per cent, respectively. The protection per cent after 90 days was maximum *i.e.* 100 per cent in case of *Neem* oil and eucalyptus oil treated groundnut seed at 0.50, 1.00 and 2.00 ml/kg was 21.25, 35.82 and 47.98, respectively. The protection of groundnut seed was minimum in case of alsi oil treated groundnut seed which was 17.85, 34.20 and 37.37 per cent at 0.50, 1.00 and 2.00 ml/kg, respectively. It is noticed from the present study that *Neem* oil and eucalyptus oil gave maximum per cent protection against acarid mite, *T. putrescentiae* infesting groundnut seed. Protections of groundnut seeds against mite, *T. putrescentiae* by various non-edible oils were computed and it was apparent that *Neem* oil provided the maximum protection against the mite pest. The relative protection measured as the decrease in population build-up as compared to percentage of untreated control. Point out that *Neem* oil and eucalyptus oil at 0.50, 1.00 and 2.00 ml/kg provided 100 per cent protection. So, *Neem* oil and eucalyptus oil treatments appear to be most promising one in controlling the population of mite. The lowest protection was offered by alsi oil at all concentrations. This may be due to the fact that oils may contain certain active principals, antifeedent, repellent and growth regulatory properties which can successfully manage the mites. The results are almost in close agreement with Rani (2000) who observed that application of non-edible oils reduced significantly the population of stored mite, *S. nesbitti* in pigeonpea during storage. Further, *Neem* oil and eucalyptus oil was found effective and gave maximum per cent protection of various grains against acarid mite, *T. putrescentiae* (Anita, 2010).

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REFERENCES

Anita (2010). Feeding potential of *Tyrophagus putrescentiae Schrank* (Acari: Acaridae) and its management. M.Sc. Thesis, C.C.S. Haryana Agricultural University, Hisar: pp. 82.

Assis, C., Manoel, G.C., Gondim, J., Herbert, A.A. and Claudio, A.G. (2011). Toxicity of essential oils from plants towards *Tyrophagus putrescentiae* (Schrank) and *Suidasia pontifica* Oudemans (Acari: Astigmata). *J. Stored. Prod. Res.*,**47**: 311-315.

Hughes, A.M. (1976). The Mites of Stored Food and Houses, Vol. 9. 2nd Edition. Technical Bulletin of the Ministry of Agriculture, Fisheries and Food, 400.

Rani, Suman (2000). Evaluation of oils ass grain protectants against an acarid mite, *Suidasia nesbitti* in stored pigeonpea. M. Sc. Thesis, C.C.S. Haryana Agricultural University, Hisar. pp.107.

Rim, I. and Jee, C. (2006). Acaricidal effects of herb essential oils against *Dermatophagoides farinae* and *D. pteronyssinus* (Acari: Pyroglyphidae) and qualitative analysis of a herb *Mentha pulegium* (pennyroyal). *Korean J. Parasitol*, **44**(2): 133-138.

Schrank, F.V.P. (1781). Enumeratio insectorum Austriae indigenorum. vid, Eberhardi Klett et Frank., Augustae

Vindelicorum.

Shaaya, E., Kostjukovsk, M., Eilberg, J. and Sukprakarn C. (1997). Plant oils as fumigants and contact insecticides for the control of stored-product insects. *J. Stored Prod. Res.*, **33**(1):7-15.

Weaver, D.K. and Petroff, A.R. (2009). Pest Management for Grain Storage and Fumigation. Department of Entomology, Montana State University, 333 Leon Johnson Hall, Bozeman, MT.

Zdarkova, E. (1971). Orientation of *Tyrophagus putrescentiae* (Schrank) towards olfactory stimuli. *In*: *Proc. 3rd Intl. Congr. Acarol*, Prague, 241-246.